

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently amended) A method, ~~for determining the quality of a digital image of a document~~ comprising:

- (a) ~~providing~~ receiving a digital image of a document associated with a document type,
the digital image including a plurality of black and white pixels arranged in rows;
- (b) locating at least two predefined portions of the digital image;
- (c) calculating a an area confidence level for each of the predefined portions of the digital image ~~by comparing the~~ as a function of a total number of black pixels located in the predefined portion relative to an expected number of black pixels for the predefined portion;
- (d) calculating a text confidence level ~~by identifying groups of touching pixels as a function of a total number of pixel groups relative to a total number of characters, wherein each pixel group comprises a set of touching black pixels and each character comprises one or more pixel groups~~;
- (e) calculating an image profile confidence level ~~by identifying the mean number of black pixels per row, the standard deviation of the distribution of black pixels in each row; as a function of a black pixel distribution and a the black pixel density; and selecting smaller of the standard deviation of black pixels in each row and the black pixel density~~;

~~(f) creating calculating an overall~~ image confidence level as ~~the product a function of the~~ area confidence level levels for the predefined portions, the text confidence level, and the image profile confidence level; and

~~comparing the calculated image confidence level to a threshold level for determining whether the digital image is acceptable~~

~~(g) storing the digital image as a result of determining that the overall image confidence level is greater than or equal to a threshold value associated with the document type of the image.~~

2. (Original) The method of claim 1 wherein the document is a bank check and locating the at least two predefined portions of the digital image includes locating the payee line of the check and the legal amount text of the check.

3. (Currently amended) A method, ~~for determining the quality of a digital image of a document comprising:~~

~~(a) providing receiving a digital image of a document associated with a document type,~~ the digital image including a plurality of black and white pixels arranged in rows;

~~(b) creating calculating an image profile confidence level by identifying the mean number of black pixels per row, the standard deviation of the distribution of black pixels in each row, as a function of a black pixel distribution and a the black pixel density, and selecting the smaller of~~

~~the standard deviation of the distribution of black pixels in each row and the black pixel density;~~

(c) identifying at least two text fields of the digital image;

~~determining the number of black pixels in each located text field to identify a character mass for each located text field;~~

~~reducing the image profile confidence level if the character mass is greater than a minimum character mass to calculate an updated image profile confidence level for each of the located text fields;~~

~~determining the number of broken characters in each located text field;~~

~~reducing the updated image profile confidence level by a percentage of the number of broken characters compared to the total number of characters for each located text field;~~

~~locating lines within the document image;~~

~~calculating a line area confidence level as a ratio of the number of pixels in characters located above the line in each of the located text fields to an expected number of pixels;~~

~~calculating a new profile confidence level as the product of the prior updated profile confidence level and the line area confidence level for each of the located text fields;~~

(d) for each of the at least two text fields, calculating a respective field confidence level as a function of the image profile confidence level, a character mass, broken characters, and a line area confidence level;

(e) setting the an document overall image confidence level to the minimum of the new profile at least two field confidence levels for all located text fields; and

~~comparing the overall document image confidence level to a threshold level for
determining whether the digital image is acceptable~~

(f) storing the digital image as a result of determining the overall image confidence level
is greater than or equal to a threshold value associated with the document type of the image.

4. (Original) The method of claim 3 wherein the document is a bank check and the text fields are selected from the group consisting of: payee name, legal amount, courtesy amount, date and signature.

5. (New) The method of claim 1, wherein the digital image is a first digital image of the document received from scanning equipment, and further comprising, prior to performing step (g):

determining that the overall image confidence level is less than the threshold value;

receiving a second digital image of the document;

replacing the first digital image with the second digital image, wherein the second digital image is treated as the digital image; and

repeating steps (b) through (f).

6. (New) The method of claim 5, wherein the second digital image is a result of one or more of (i) a modification of the document prior to receiving the second digital image, (ii) a

modification of the scanning equipment, or (iii) a modification to a scanned image prior to receiving.

7. (New) The method of claim 1, wherein calculating the area confidence level comprises:

dividing the total number of black pixels in the predefined portion by the expected number of black pixels for the predefined portion to produce a quantity;

if the quantity is less than or equal to 1, setting the area confidence level equal to the quantity; and

if the quantity is greater than 1, setting the area confidence level equal to 1.

8. (New) The method of claim 1, wherein calculating the text confidence level comprises:

subtracting the total number of characters from the total number of pixel groups to produce a first quantity;

dividing the first quantity by the total number characters to produce a second quantity;
and

subtracting the second quantity from 1 to produce a third quantity;

if the third quantity is non-negative, setting the text confidence level equal to the third quantity; and

if the third quantity is negative, setting the text confidence level equal to 0.

9. (New) The method of claim 1, wherein calculating the image profile confidence level comprises:

calculating a standard deviation of the black pixel distribution in each row;

calculating the black pixel density as a ratio of a total number of black pixels in an image area to a total number of pixels in the image area; and

setting the image profile confidence level equal to the smaller of (i) a function of the standard deviation and (ii) a function of the black pixel density.

10. (New) The method of claim 9, wherein calculating the image profile confidence level further comprises:

adjusting the standard deviation of the black pixel distribution based on a maximum allowable standard deviation and a minimum allowable standard deviation; and

adjusting the black pixel density based on a maximum allowable black pixel density and a minimum allowable black pixel density.

11. (New) The method of claim 1, wherein calculating the overall image confidence level comprises setting the overall image confidence level equal to a product of the area confidence level, the text confidence level, and the image profile confidence level.

12. (New) The method of claim 3, wherein the digital image is a first digital image of the document received from scanning equipment, and further comprising, prior to performing step (f):

determining that the overall image confidence level is less than the threshold value;

receiving a second digital image of the document;

replacing the first digital image with the second digital image, wherein the second digital image is treated as the digital image; and

repeating steps (b) through (e).

13. (New) The method of claim 12, wherein the second digital image is a result of one or more of (i) a modification of the document prior to receiving the second digital image, (ii) a modification of the scanning equipment, or (iii) a modification to a scanned image prior to receiving.

14. (New) The method of claim 3, wherein calculating the image profile confidence level comprises;

calculating a standard deviation of the black pixel distribution in each row;

calculating the black pixel density as a ratio of a total number of black pixels in an image area to a total number of pixels in the image area; and

setting the image profile confidence level equal to the smaller of (i) a function of the standard deviation and (ii) a function of the black pixel density.

15. (New) The method of claim 14, wherein calculating the image profile confidence level further comprises:

adjusting the standard deviation of the black pixel distribution based on a maximum allowable standard deviation and a minimum allowable standard deviation; and

adjusting the black pixel density based on a maximum allowable black pixel density and a minimum allowable black pixel density.

16. (New) The method of claim 3, wherein calculating the respective field confidence level comprises:

initializing the respective field confidence level to the image profile confidence level;

determining a minimum character mass;

for every character in the respective text field, reducing the respective field confidence level if the character mass of the character is greater than the minimum character mass;

determining a total number of broken characters in the respective field;

reducing the respective field confidence by a proportion of the total number of broken characters to a total number of characters in the text field;

determining if a line is located in any of the at least two text fields; and

for each line located:

calculating the line area confidence level as a ratio of a total number of black pixels located above each line to an expected number of black pixels above the respective line; and

adjusting the respective field confidence level in proportion to a product of the respective field confidence level and the line area confidence level.

17. (New) The method of claim 16, wherein determining the total number of broken characters comprises identifying the number of characters comprising a plurality of pixel groups, wherein a pixel group comprises a set of touching black pixels.

18. (New) A method, comprising:

determining that a first overall confidence level of a first digital image of a document associated with a document type is less than a threshold value associated with the document type;

receiving a second digital image of the document, the digital image including a plurality of black and white pixels arranged in rows;

locating at least two predefined portions of the second digital image;

calculating an area confidence level for each of the predefined portions of the second

digital image as a function of a total number of black pixels located in the predefined portion relative to an expected number of black pixels for the predefined portion;

calculating a text confidence level as a function of a total number of pixel groups relative to a total number of characters, wherein each pixel group comprises a set of touching black pixels and each character comprises one or more pixel groups;

calculating an image profile confidence level as a function of a black pixel distribution and a black pixel density;

calculating a second overall image confidence level as a function of the area confidence level, the text confidence level, and the image profile confidence level; and

storing the second digital image as a result of determining that the second overall image confidence level is greater than or equal to the threshold value.

19. (New) The method of claim 18, wherein the second digital image is a result of one or more of (i) a modification of the document prior to receiving the second digital image, (ii) a modification of the scanning equipment, or (iii) a modification to a scanned image prior to receiving.

20. (New) A method, comprising:

determining that a first overall confidence level of a first digital image of a document associated with a document type is less than a threshold value associated with the document type;

receiving a second digital image of the document, the digital image including a plurality of black and white pixels arranged in rows;

calculating an image profile confidence level of the second digital image as a function of a black pixel distribution and a black pixel density;

identifying at least two text fields of the second digital image;

for each of the at least two text fields, calculating a respective field confidence level as a function of the image profile confidence level, a character mass, broken characters, and a line area confidence level;

setting a second overall image confidence level to the minimum of the at least two field confidence levels; and

storing the second digital image as a result of determining the overall image confidence level is greater than or equal to a threshold value.

21. (New) The method of claim 20, wherein the second digital image is a result of one or more of (i) a modification of the document prior to receiving the second digital image, (ii) a modification of the scanning equipment, or (iii) a modification to a scanned image prior to receiving.